ICE STORMS AND TREES

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Several papers, particularly those of Harshberger[1] and Illick[2], have given accounts of ice storms and some of their effects on trees. Both of the studies cited were conducted in Pennsylvania and apparently little data on this subject has heretofore been collected outside the Atlantic coastal territory. It is thought that data from a different climatic district will be of some interest.

Opportunity for study of ice storms in their relation to trees in the Middle West was afforded by the visit in 1922 of two of these storms to central Wisconsin. The first occurred late in February and was heavily destructive; the second came late in March, was much less severe and was easily withstood by the trees.

The first storm began on February 21, with a light rain falling and with the thermometer registering slightly below freezing. The rain froze immediately wherever it fell. By the following morning ice had accumulated in considerable quantities on all trees. Twigs of *Acer saccharum* examined at the time showed marked increases in diameter and weight. Meteorological conditions remained practically constant for many hours more. Following the storm a period of cold weather made it possible to study the accumulations of ice on various plants.

Increase in Twig Size

Most of the measurements of twigs were made in the field. Readings were made directly from a millimeter scale which was held against the stems. The great majority of stems had accumulated thicker ice layers on the windward side and measurements of the greater and lesser diameters were necessary. These were made, in each case, at the same point on the twig. The results appear in the following table.

[1] Harshberger, John W.: The Relation of Ice Storms to Trees. Contrib. Bot. Lab. Univ. of Penna., II: 345–349, 1904.

[2] Illick, J. S.: A Destructive Snow and Ice Storm. Forest Leaves, XV, 103–107, Feb. 1916.

Name	Greater and lesser diameters of part with ice, in millimeters	Average of greater and lesser diameters with ice, in millimeters	Diameter of twig without ice	Increase in diameter due to ice, in millimeters	Percentage of increase
Acer saccharinum[2]	20 × 12	16.0	3.0	13.0	433
Carya ovata[2]	17 × 17	17.0	3.0	14.0	466
Quercus alba[2]	18 × 13	15.5	4.75	10.75	226
Populus deltoides[2]	23 × 17	20.0	4.5	15.5	344
Betula sp.[2]	14 × 10	12.0	1.5	10.5	700
Tilia americana	23 × 23	23.0	3.0	20.0	666
Tilia americana	23 × 19	21.0	2.0	19.0	950
Tilia americana	25 × 20	22.5	2.5	20.0	800
Acer Negundo	26 × 26	26.0	3.5	22.5	642
Acer Negundo	26 × 18	22.0	3.0	19.0	633
Acer Negundo	35 × 20	27.5	4.0	23.5	587
Ulmus americana	26 × 23	24.5	3.0	21.5	716
Prunus sp.	38 × 24	31.0	3.5	27.5	785

Increase in Twig Weight

Twigs from different trees were taken into the laboratory and weighed. After the ice had melted off they were reweighed. Several series from different localities were thus studied at different times. The data is here combined in one table.

Number of twigs	Name	Weight with ice in grams	Weight without ice in grams	Weight of ice in grams	Ratio fo ice weight to twig weight
1	*Tilia americana*	49.0	3.0	46.0	15:1
1	*Acer saccharinum*	54.0	2 0	52.0	26:1
1	*Prunus virginiana*	48.0	2.4	45.6	19:1
1	*Carya ovata*	97.0	3.8	93.2	24:1
1	*Crataegus sp.*	32.0	0.9	31.1	34:5
1	*Fagus grandifolia*	164.0	5.0	159.0	31:1
1	*Carpinus caroliniana*	10.0	1.0	9.0	9:1
1	*Ulmus fulva*	197.5	9.2	188.3	20:1
1	*Picea abies*	117.5	5.5	112.0	20:1
1	*Picea abies*	200.0	11 6	188.4	16:1

[2] Second storm, March 18.